From Water Scarcity to Water Security : Gujarat's Water Infrastructure Development

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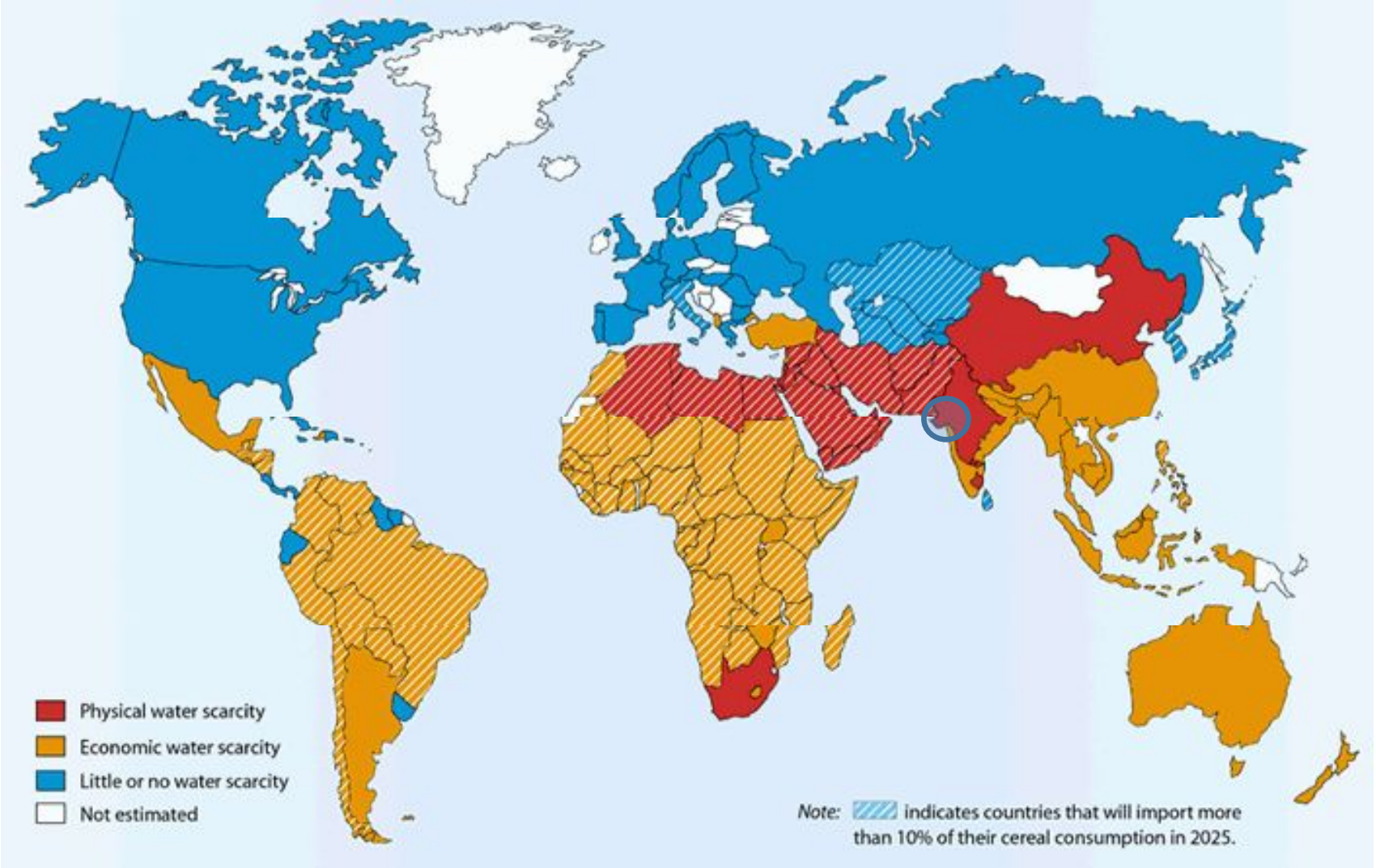
Enhancing Sustainability & Resilience of Water Infrastructure for Disaster Risk Reduction & Management in South Asia
26th March 2025

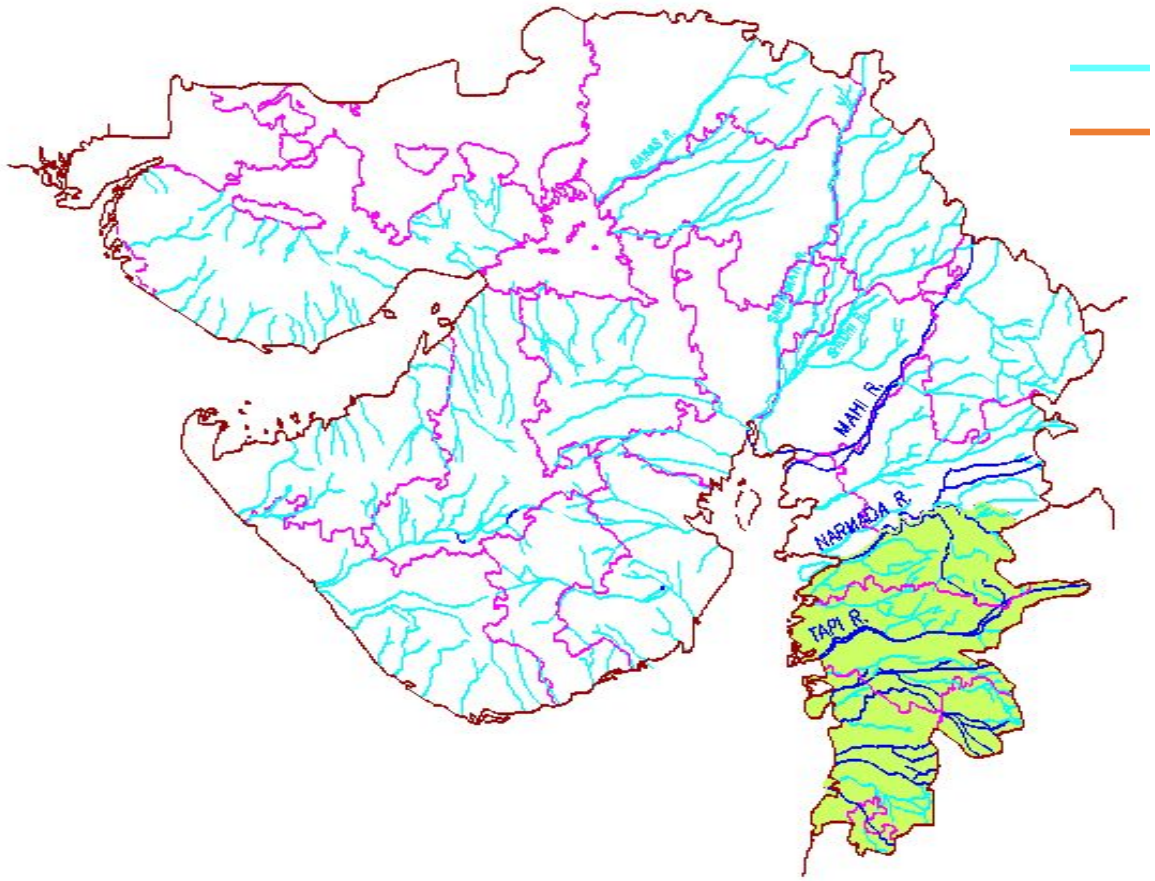
Last few years of the Last Century

Projected Water Scarcity in 2025



Source: The Global Water Scarcity Study, IWMI, 1998

River Map of Gujarat State



Out of 185 Rivers

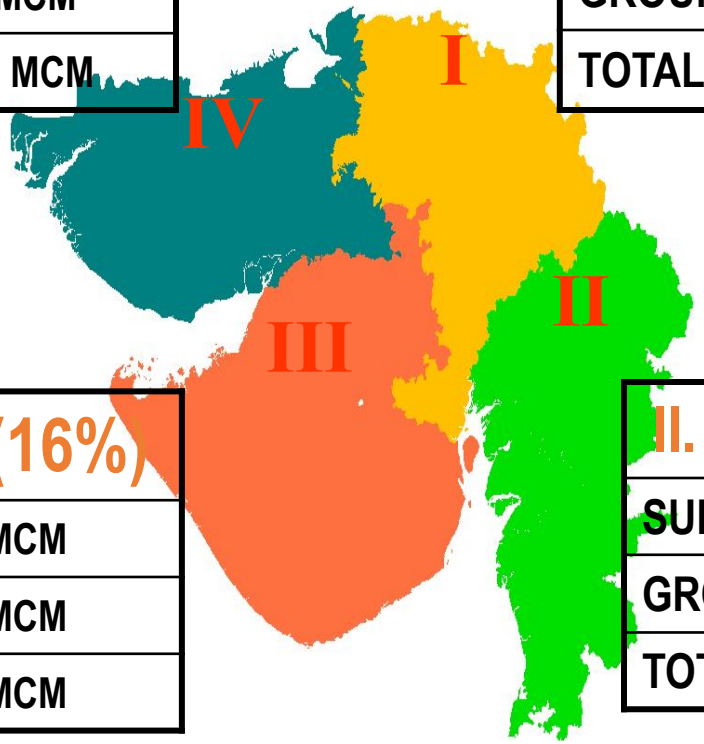
8 Perennial Rivers

24% area of the State accounts for around 77% of surface water resources

Intra-State Water Availability

IV. KACHCHH (2%)	
SURFACE WATER	650 MCM
GROUNDWATER	450 MCM
TOTAL (2%)	1100 MCM

I. NORTH GUJARAT(11%)	
SURFACE WATER	2100 MCM
GROUNDWATER	3300 MCM
TOTAL (11 %)	5400 MCM

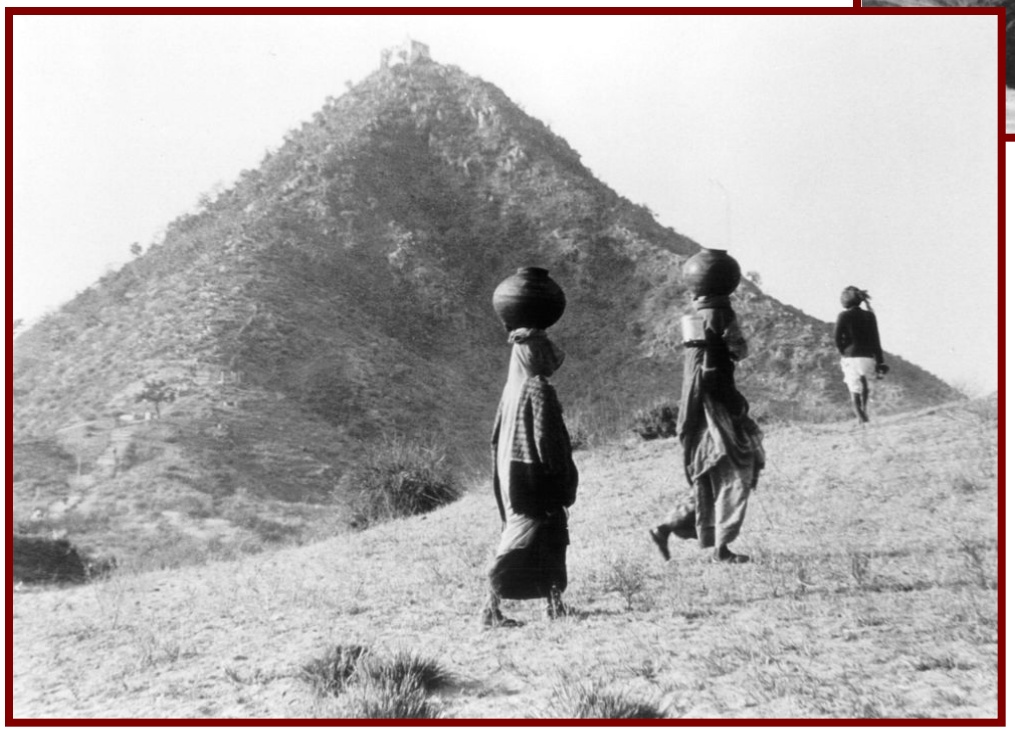


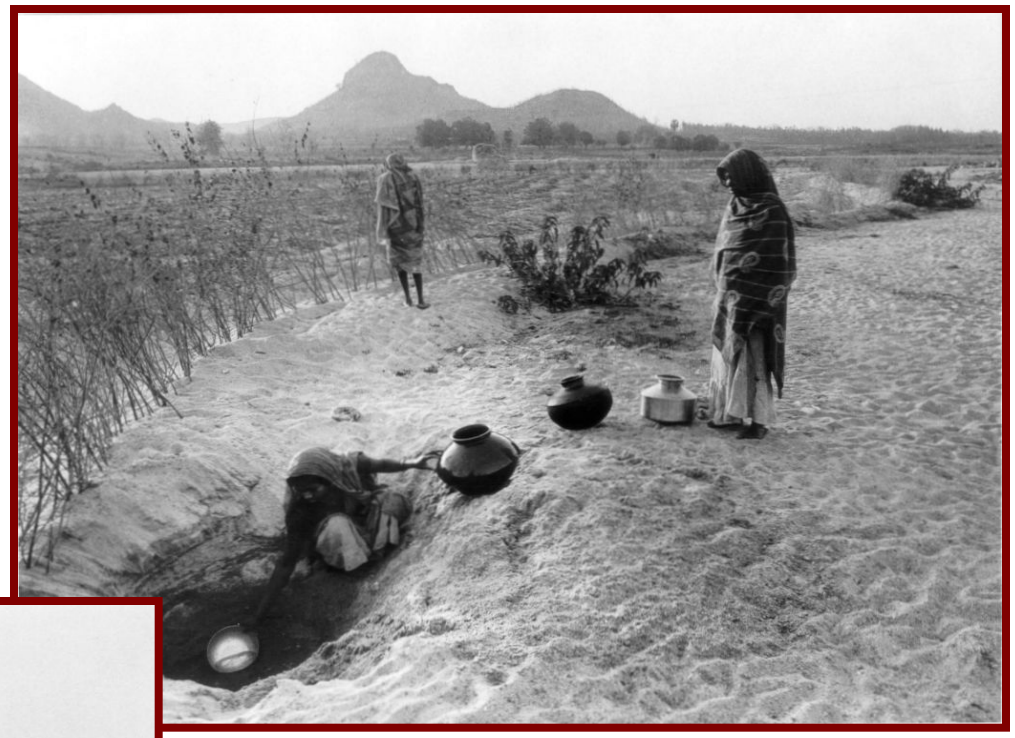
III. SAURASHTRA(16%)	
SURFACE WATER	3600 MCM
GROUNDWATER	4300 MCM
TOTAL (16 %)	7900 MCM

II. SOUTH GUJARAT(71%)	
SURFACE WATER	31750 MCM
GROUNDWATER	3950 MCM
TOTAL (71%)	35700 MCM

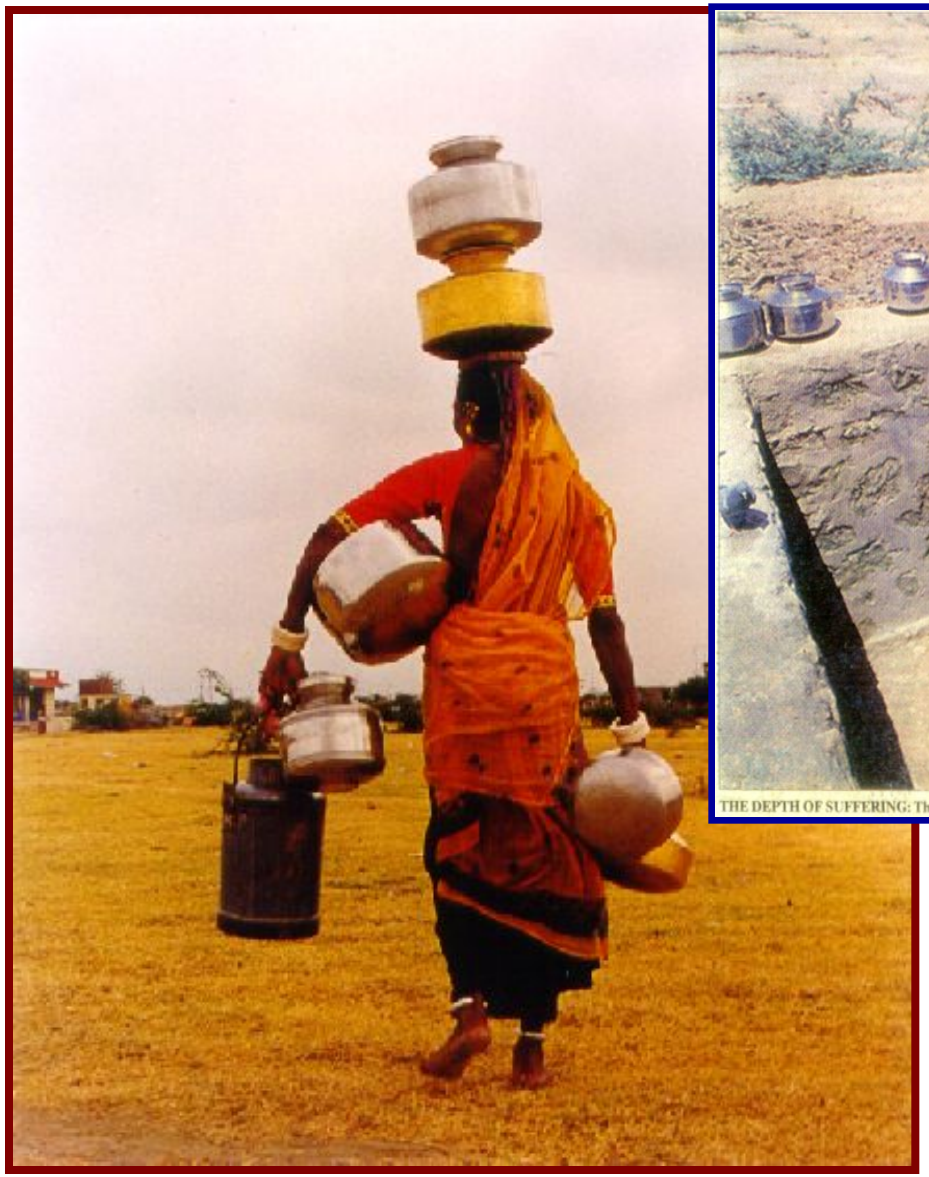
GUJARAT STATE :Surface Water 38100 MCM , Ground Water 12000 MCM
(Total of 50100 MCM)

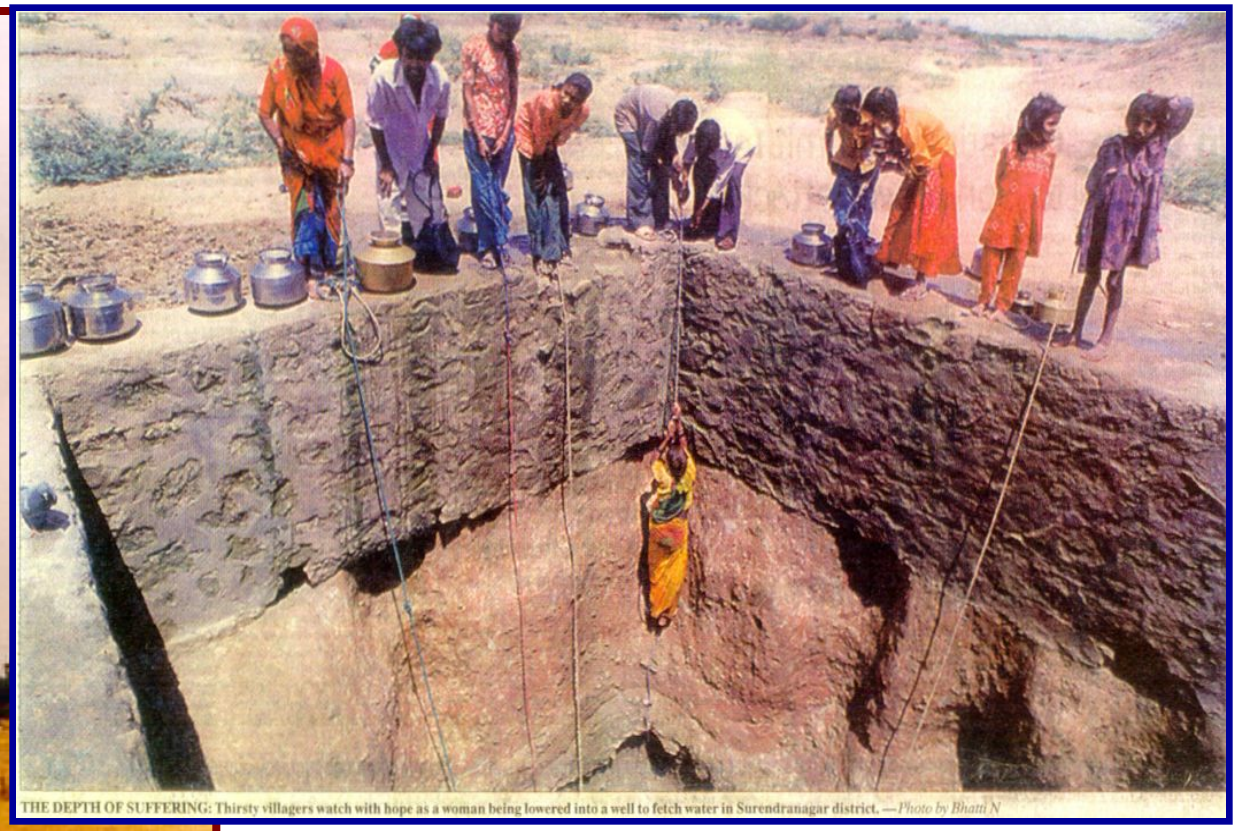
Daily drudgery of women for fetching water from many kilometers





Struggle for water





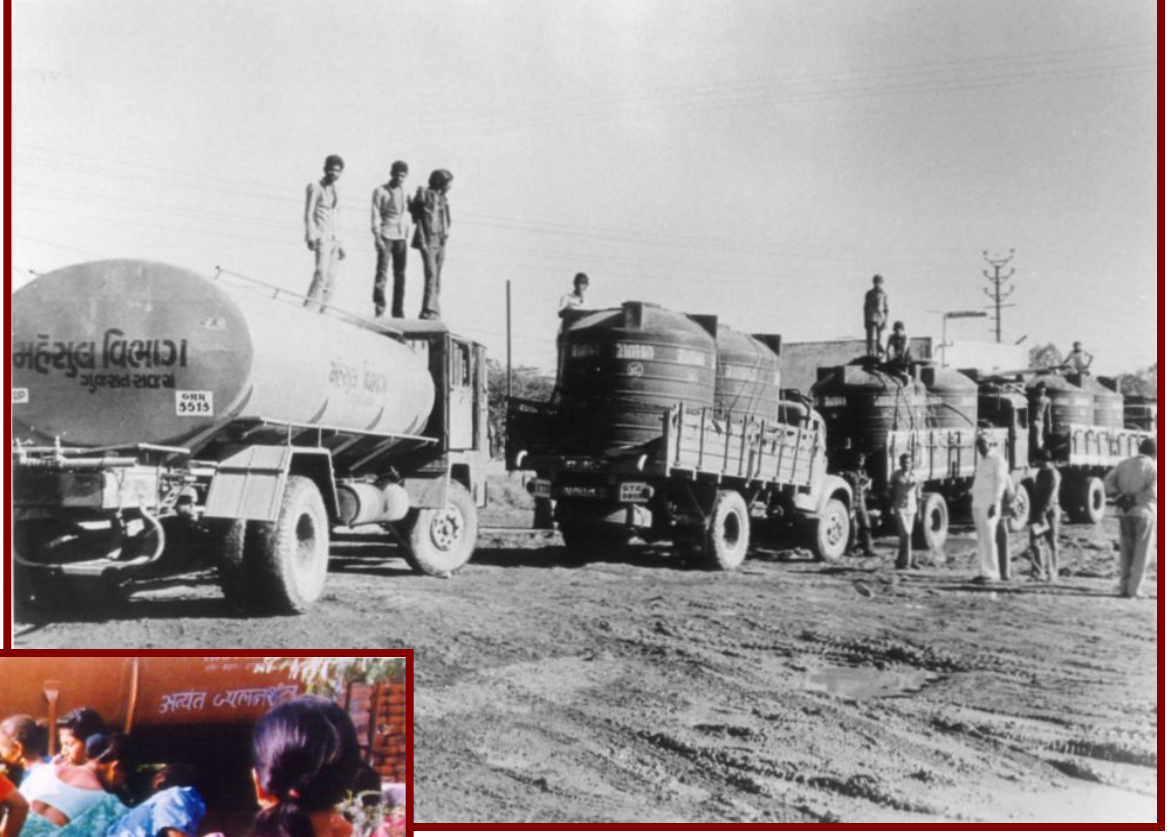
THE DEPTH OF SUFFERING: Thirsty villagers watch with hope as a woman being lowered into a well to fetch water in Surendranagar district. —*Photo by Bhatti N*

Women's struggle for water in rural areas

TOI June 3, 2003

Reuters

eople gather to draw water from a well in Natwarghad village in Gujarat on Sunday. Dams, wells and ponds have gone dry cross the western and northern parts of the state as temperatures soared above 44 degrees Celsius.



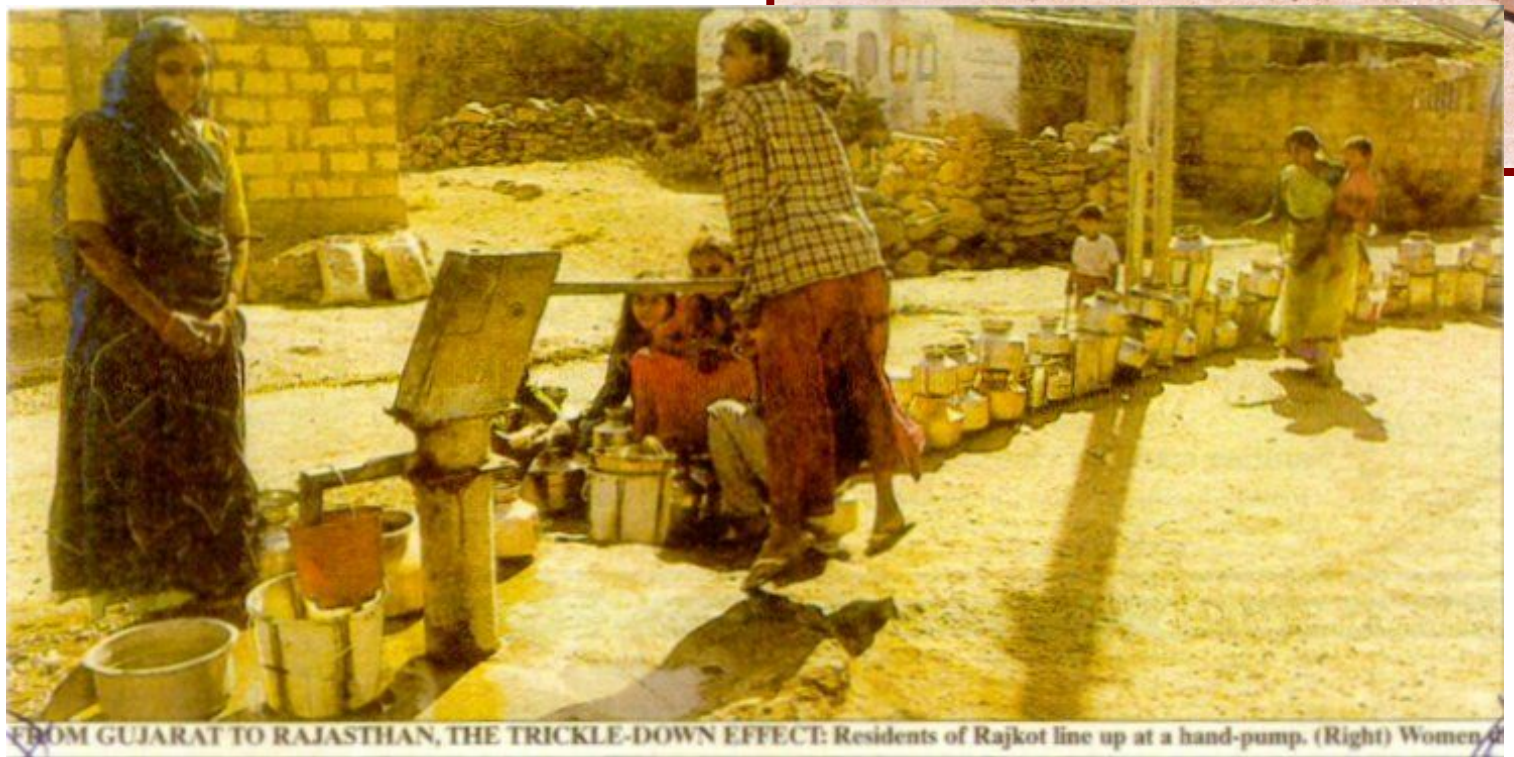
Water Supply through Tankers and Trains

India's first water train. For 6 weeks, 6 trains carried 30 lakh litres daily. (Express Archive)

May 2, 1986

India's First
Water Special Train
From
Gandhinagar to
Rajkot
Carrying
3.7 lakh litres of
Potable Water

Long Queues for Domestic Water

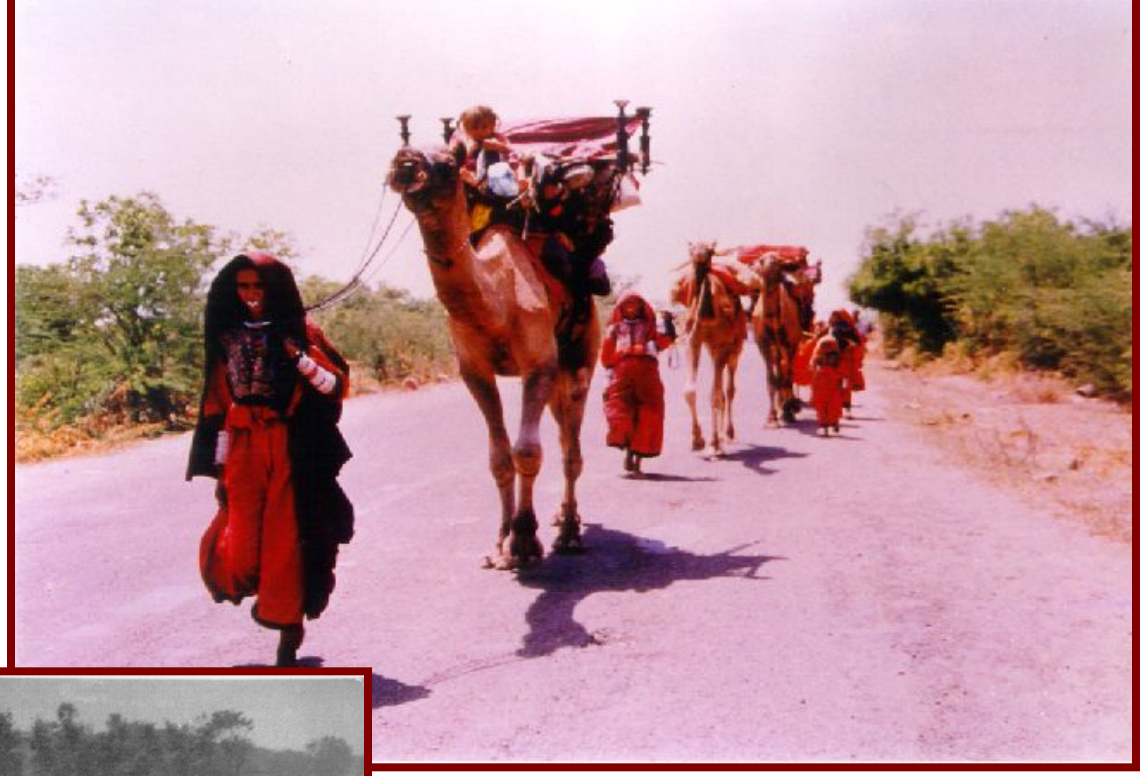


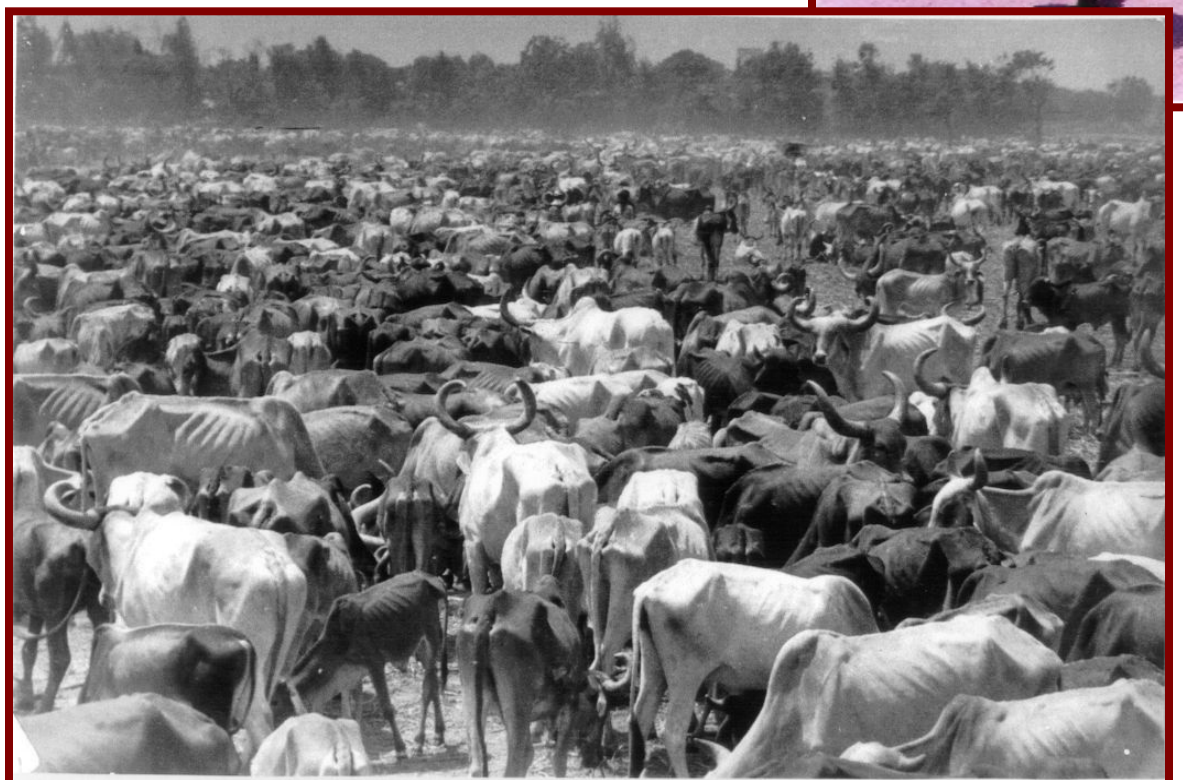
FROM GUJARAT TO RAJASTHAN, THE TRICKLE-DOWN EFFECT: Residents of Rajkot line up at a hand-pump. (Right) Women

Future generation getting permanently deformed by Dental Fluorosis

Permanent disability by Skeletal Fluorosis

Migration of human and cattle population in search of water





3 killed in police firing

Villagers agitating against water proposal turn violent

Flare-up was over sharing dam water with Jamnagar

EXPRESS NEWS SERVICE
HAJKOT, DEC 14

Farmers win water war

Dams being guarded

Dam sites being guarded

Judicial probe into Gujarat 'water riots

The Times of India News Service

Agitation turns violent

Patel has announced Rs 2 lakh in compensation to the families

Sub-inspector ... lodged a complaint ...

ISRO survey may tap ... water resources

3 killed in Jamnagar

Police opens fire as dispute over ...

Generator set ablaze; alert in Jamnagar dist

ISRO survey may ... ground water reso...

Villagers agitating against water proposal turn violent

Farmers win water w...

Agitation tu...

Patel has announced Rs 2 lakh in compensation to the families

ISRO survey may ... water reso...

3 killed in Ja...

Police opens fire as dispute o...

THE HINDU

Online edition of India's National Newspaper on indiaserver

Saturday, December 25, 1999

Regional | Previous | Next

Water riots a new worry in Gujarat

Water Riots : A Reality and NOT Rhetoric

The Transformation

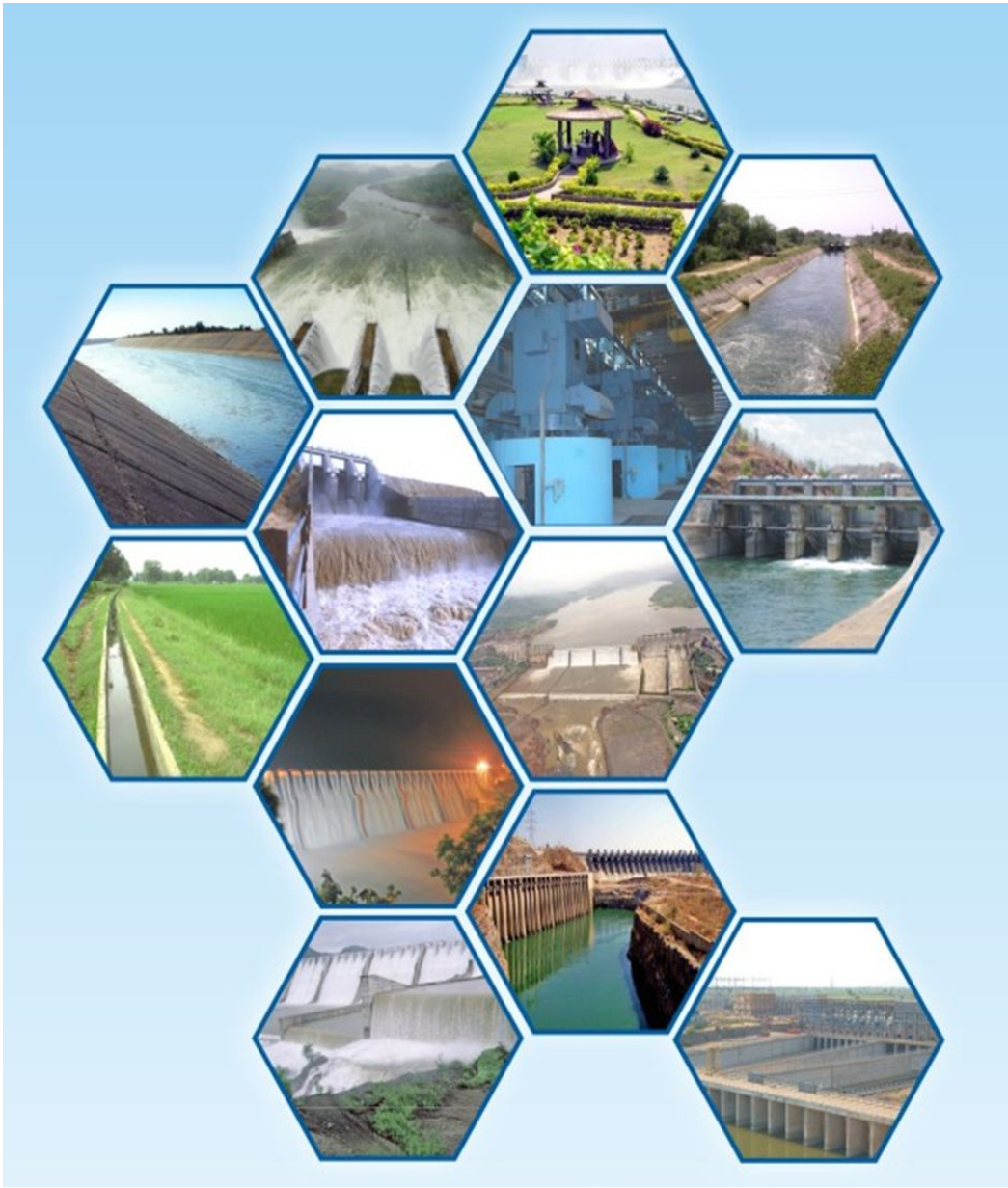
Water Index scores vary widely across states, but most states have achieved a score below 50% and could significantly improve their water resource management practices. The Water Index scores for FY 16-17 vary from 76 (Gujarat) to 26 (Meghalaya), with the median score being ~49 for Non-Himalayan states and ~31 for North-Eastern and Himalayan states (*Figure 1*). Gujarat is the highest performer, closely followed by other High performers such as Madhya Pradesh and Andhra Pradesh. Seven states have scores between ~30-65 (including two North-Eastern and Himalayan states) and have been classified as Medium performers. Alarmingly, ~60% of states (14 out of 24) have achieved scores below 30 and have been classified as Low performers (*Figure 2*). Low performers are concentrated across the populous agricultural belts of North and East India, and among the North-Eastern and Himalayan states.

- Gujarat is the highest performer with the Water Index of 76, followed by Madhya Pradesh and Andhra Pradesh
- Gujarat has performed better in 7 Themes out of 9

Recognition at the National Level by NITI Aayog

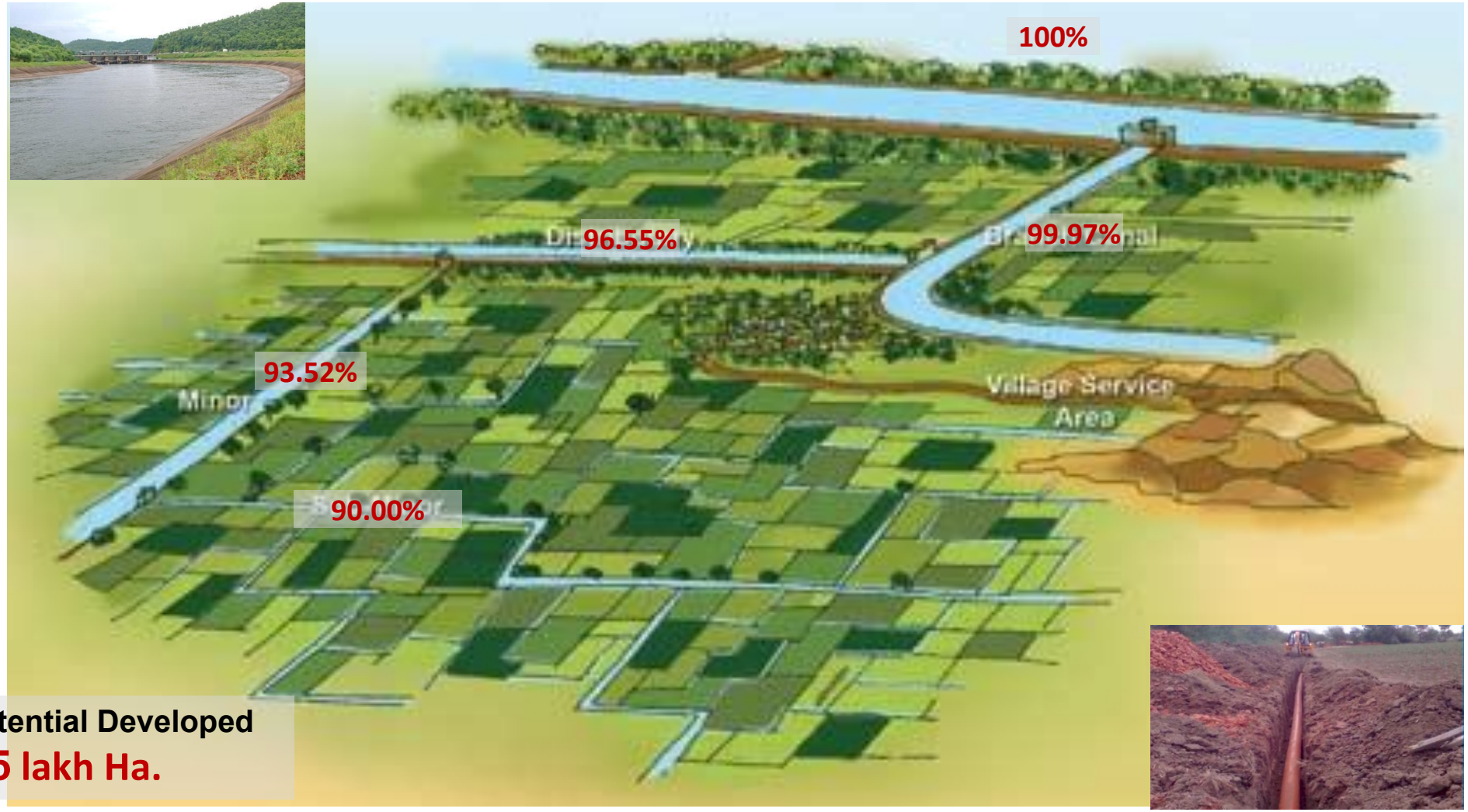
Sardar Sarovar Project on River Narmada

Harnessing the untapped waters of the Narmada for survival of millions of people and environmentally sound sustainable development of the western India by providing the essence of life-Water and Energy.



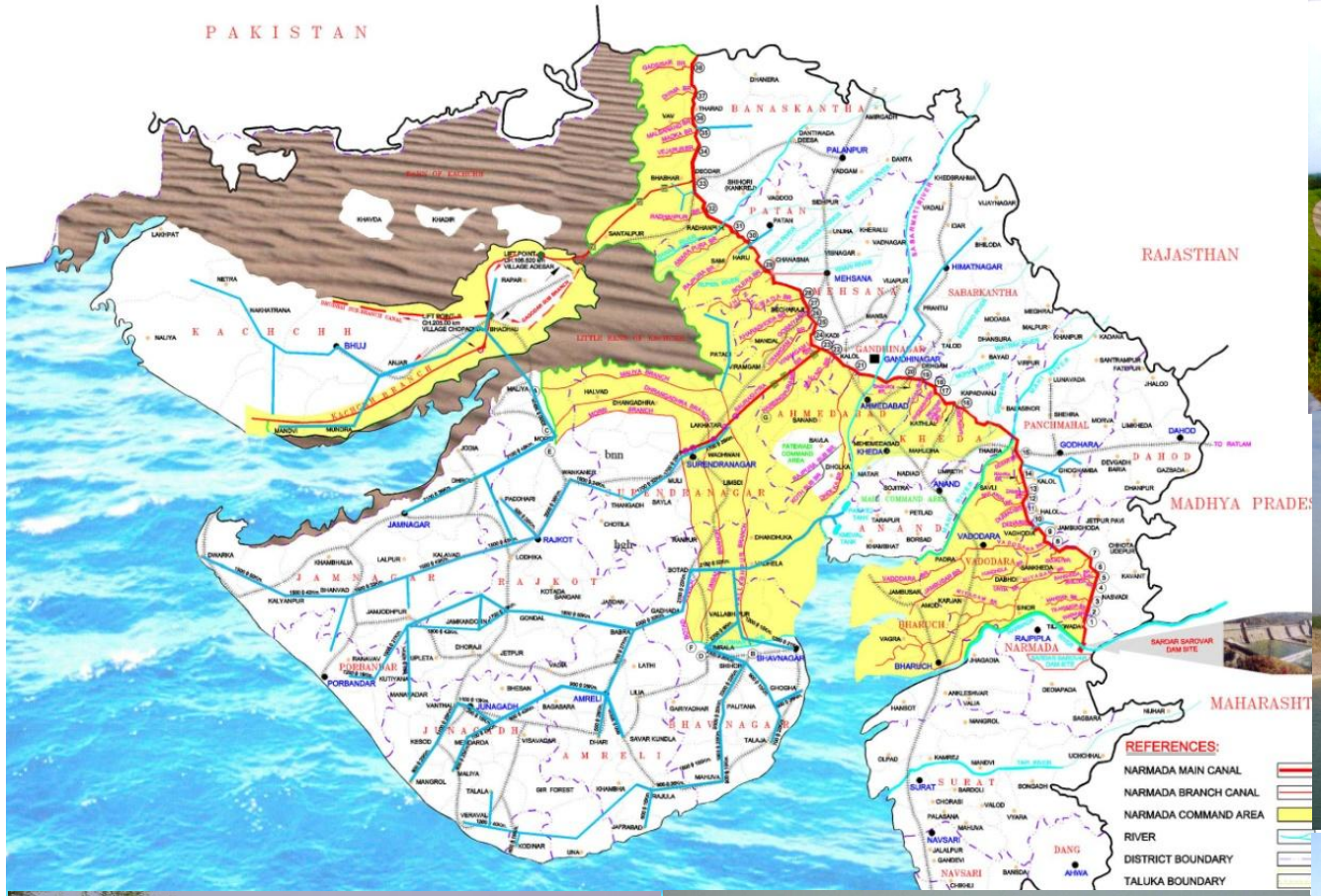
Bird's eye view of Completed Dam

Narmada Canal Network – 69,497 km Length

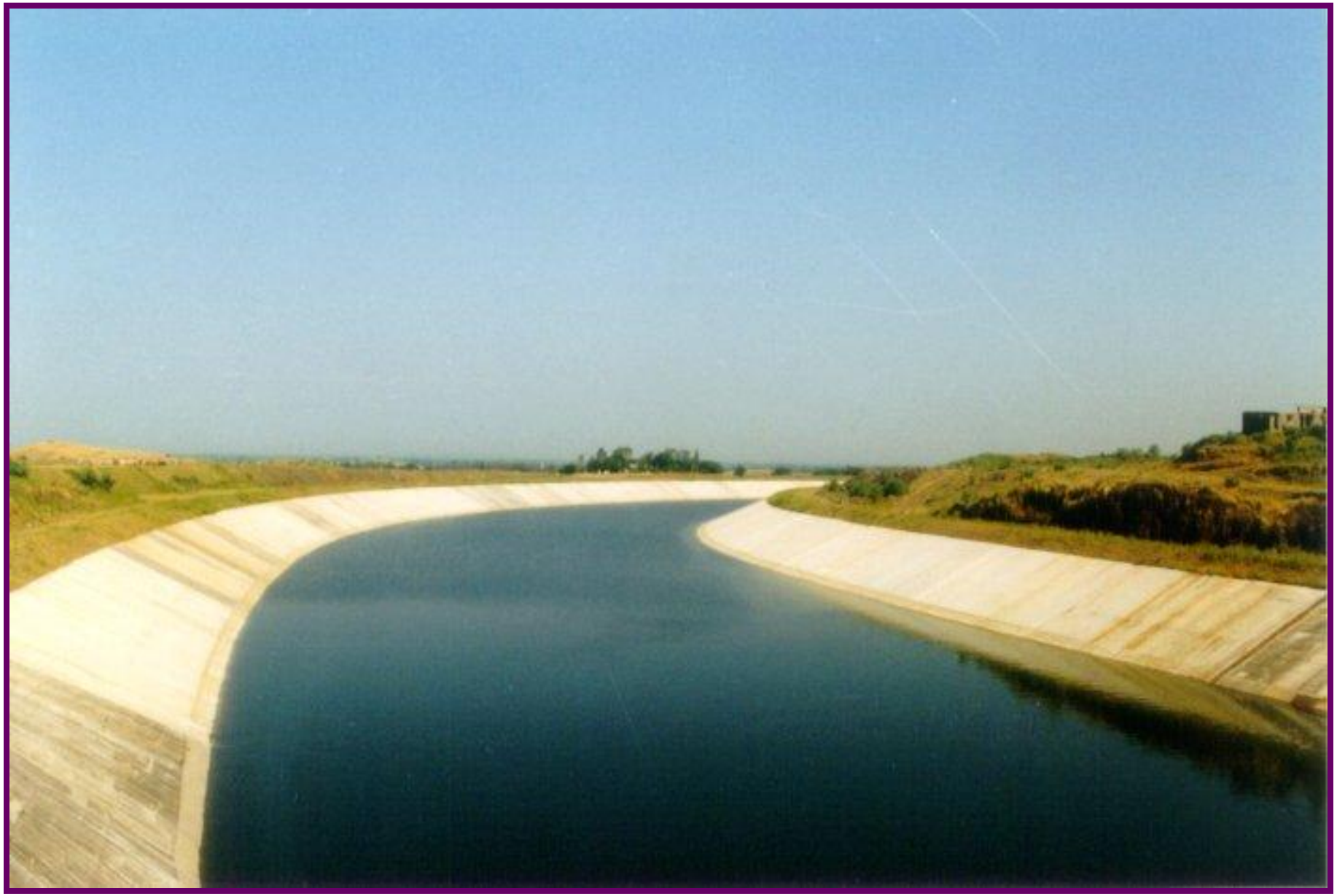


Irrigation Potential Developed
17.85 lakh Ha.

Manmade Perennial Rivers



Head Regulator of Narmada Main canal

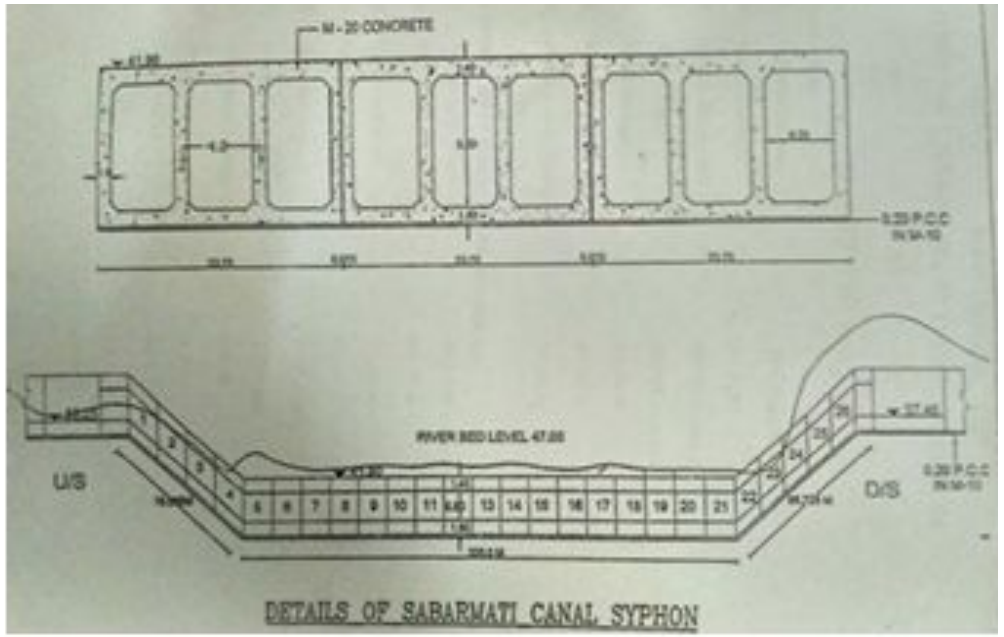


Conveying 11.7 billion cubic meter of water annually

603 m Long Mahi Aqueduct on Main Canal

3,87,000 cubic meter concrete, 22,904 tonne steel

Sabarmati
Canal Syphon



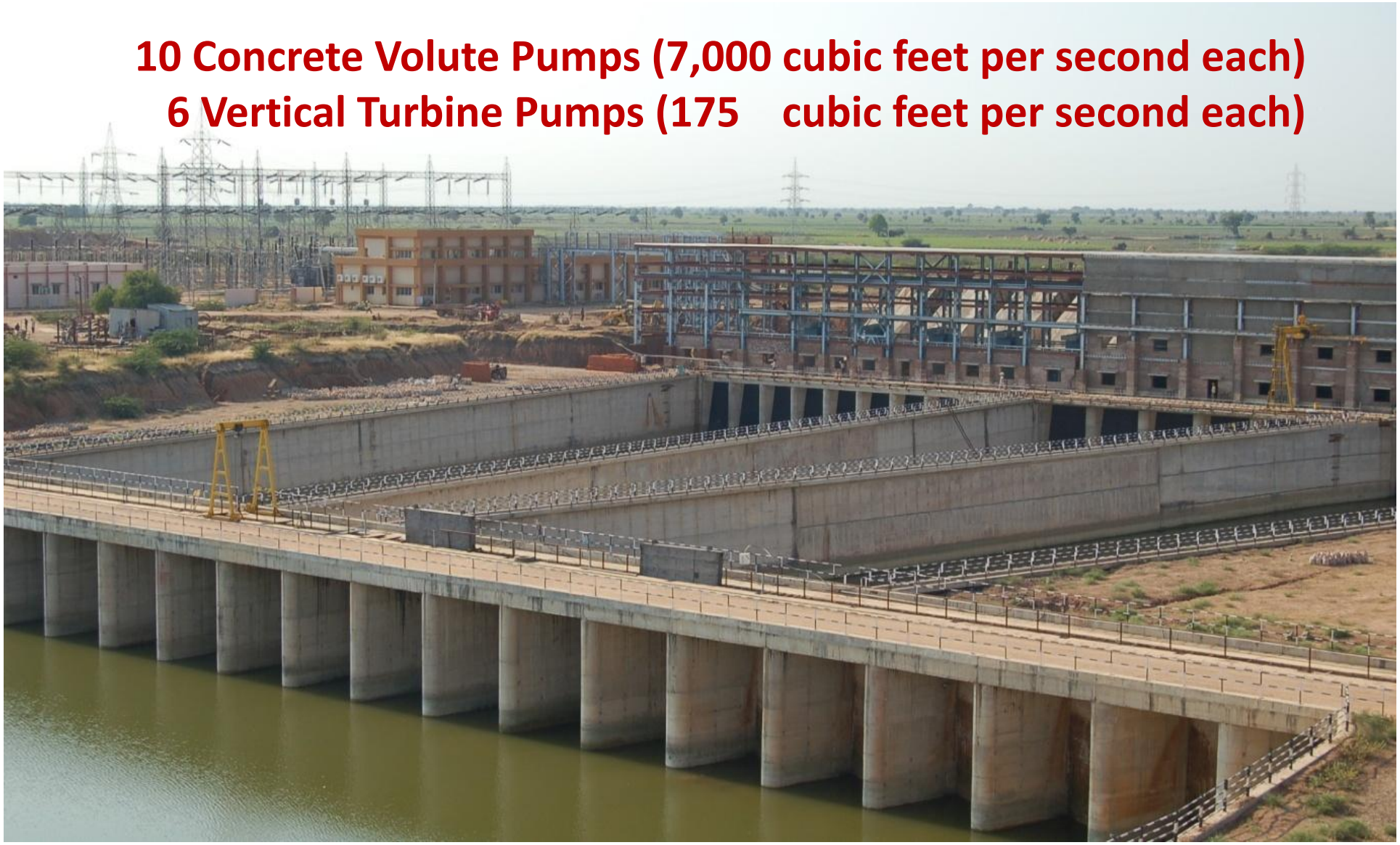
Narmada water flowing in Sabarmati - worshipped with lamps

Y Junction - Saurashtra Branch Canal off taking at Ch 263.089 km of NMC

Saurashtra Branch Canal

Asia's Largest Pumping Station on Saurashtra Branch

10 Concrete Volute Pumps (7,000 cubic feet per second each)
6 Vertical Turbine Pumps (175 cubic feet per second each)



Five such Pumping Stations in a series to lift Narmada water to Saurashtra (Total 71 M lift)

View of Pumping Station on Saurashtra Branch

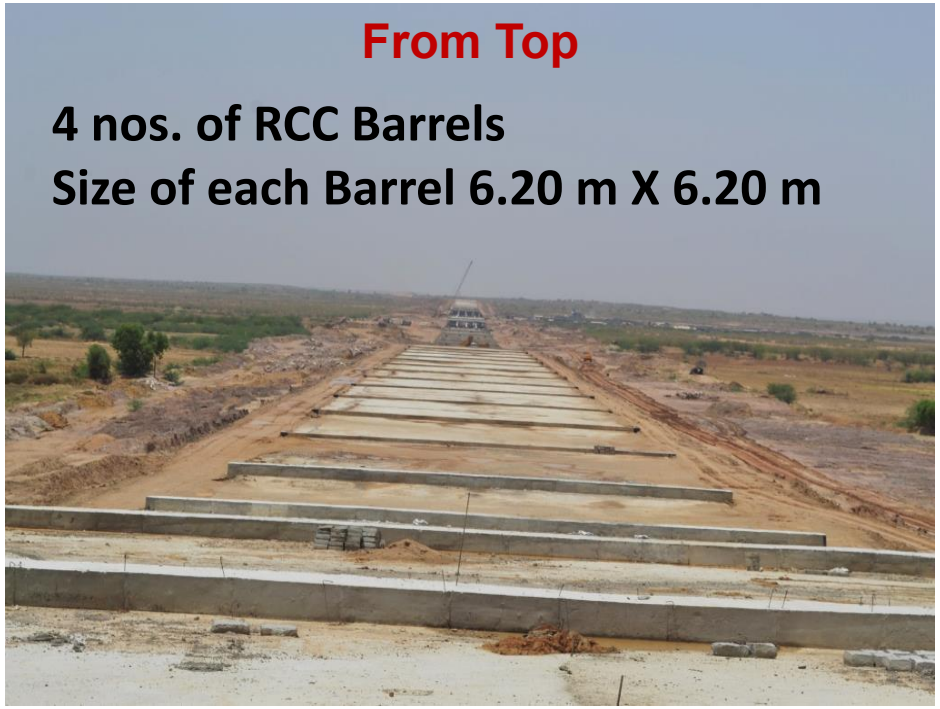
Maliya Branch Canal

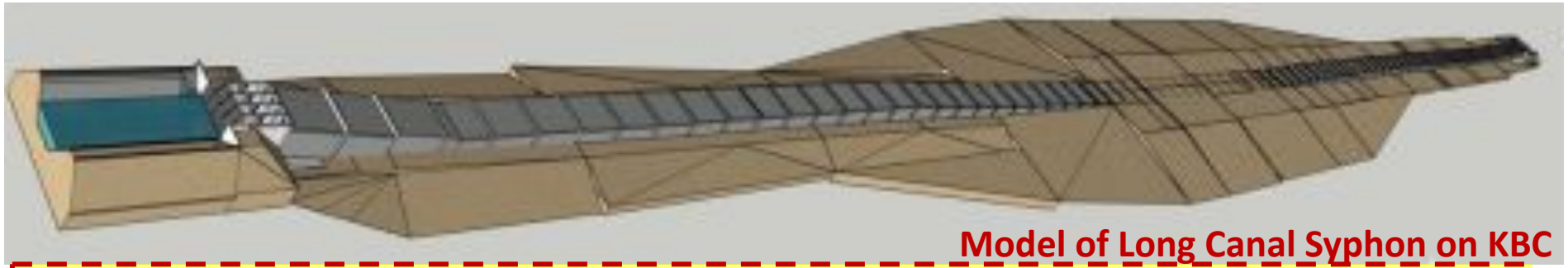
Dhrangadhra Branch Canal

Botad Branch Canal & HR of Distributary (LD-3)

WATER FLOWING IN BOTAD BRANCH CANAL AT LD-3 CH. 14710 M.

2550 m Long Canal Syphon on Kachchh Branch Canal





2,20,400 cubic meter concrete, 19,963 tonne steel

Dholi Dhaja Dam, Saurashtra - filled up with Narmada Water

Regional Transfer of Water

367 km away after Lifting by 71 m

Tappar Dam (Kachchh) filled up with Narmada Water

Regional Transfer of Water

600 km away after Lifting by 54 m

Inter-Basin Transfer of Narmada Water



Narmada water released in enroute rivers,

Heran, Orsang, Karad, Dhadhar, Mahi,

Saidak, Mohar,Shedhi, Watrak, Meshwo,

Khari, Sabarmati, Rupen, Pushpawati,

Khari-II, Banas and Saraswati.

Benefits

Frenchwells and Tubewells rejuvenated

Recharging of natural aquifers

Water quality of these rivers got enriched in terms of pH, Dissolved Oxygen, Bio-chemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD) etc.

Infrastructure linking Mahi & Narmada Canals

Sr.No	No. of Pumps to be installed	Capacity of Each pump (cusecs)	Total Pumping Capacity (cusecs)
1	8	35	280
2	8	40	320
Total	16		600

Pumping Station on MRBC

Infrastructure linking Mahi & Narmada Canals

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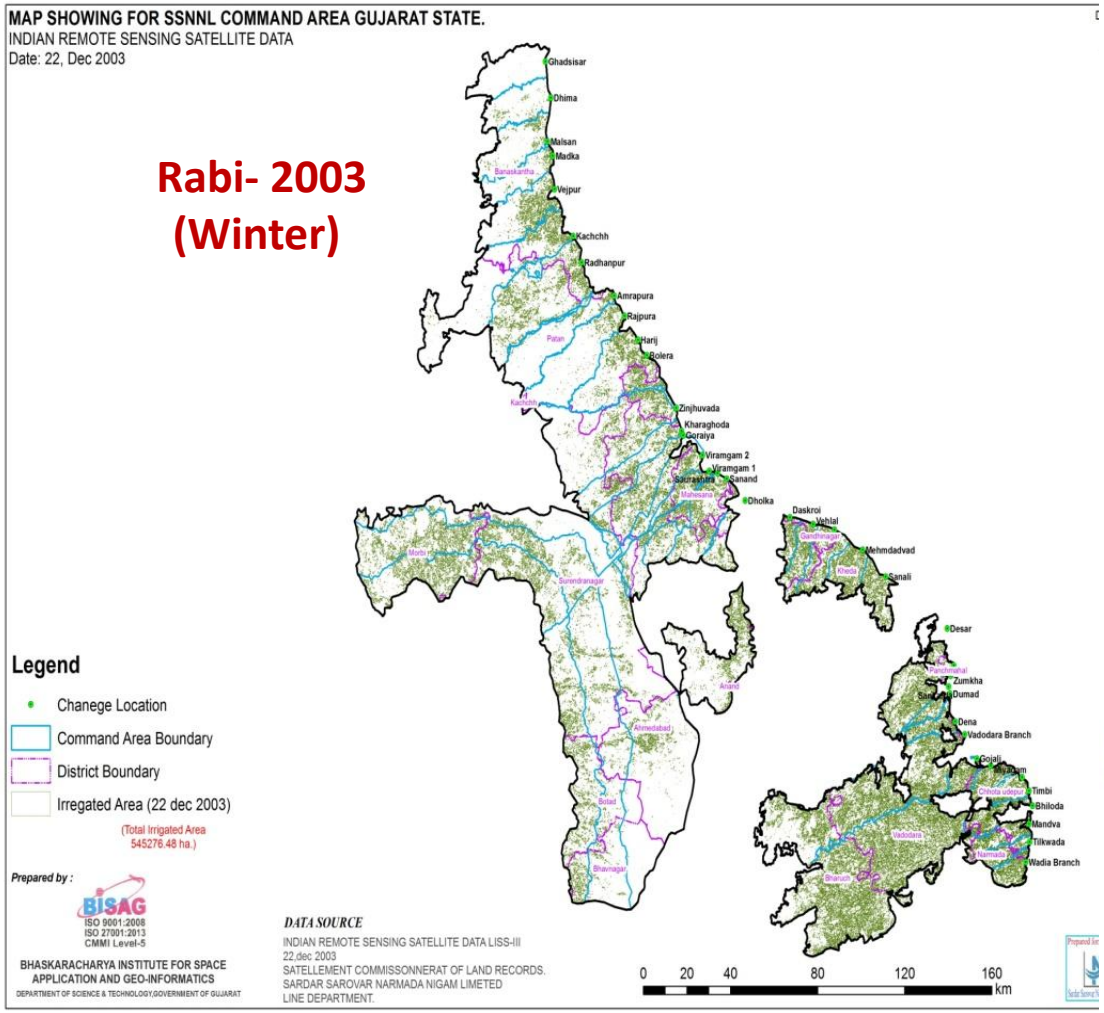
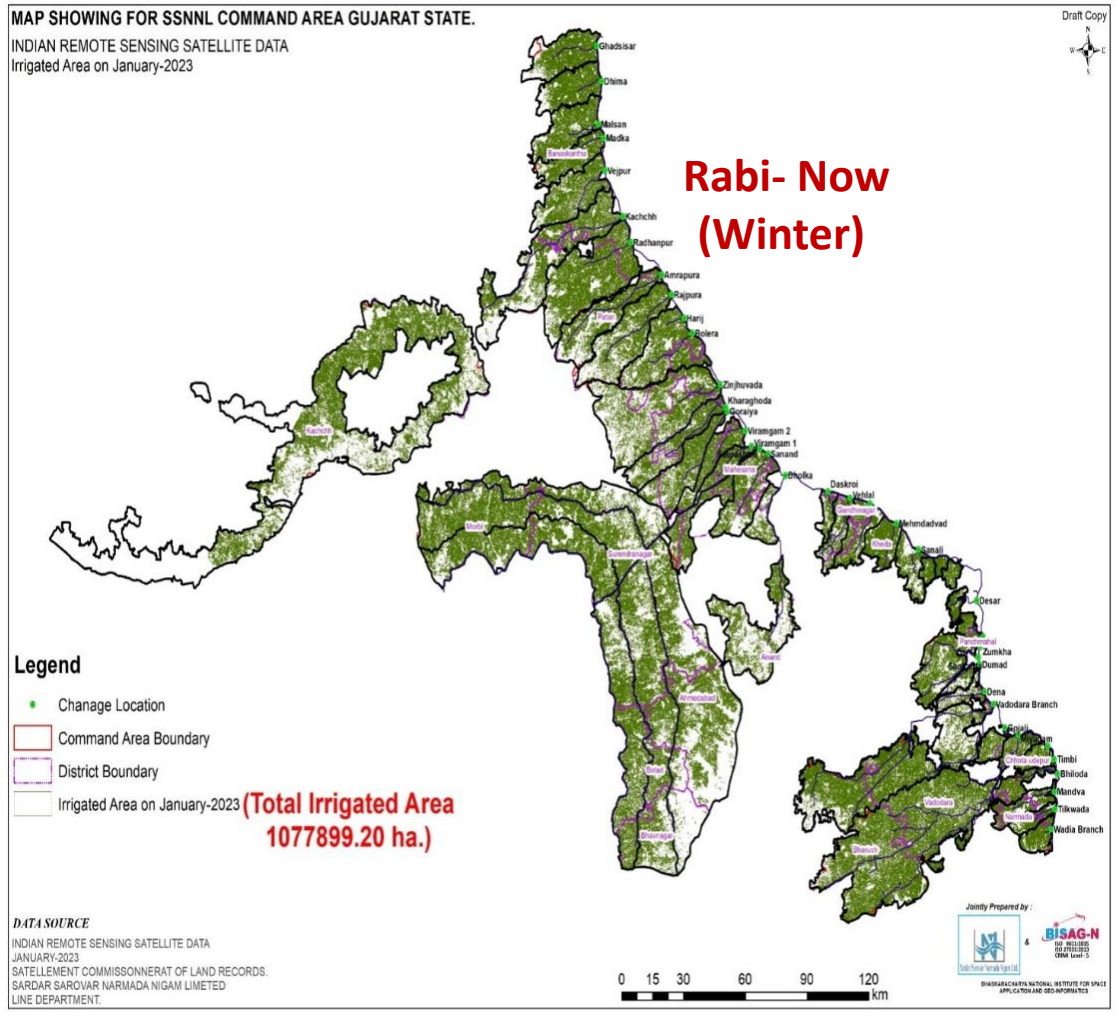
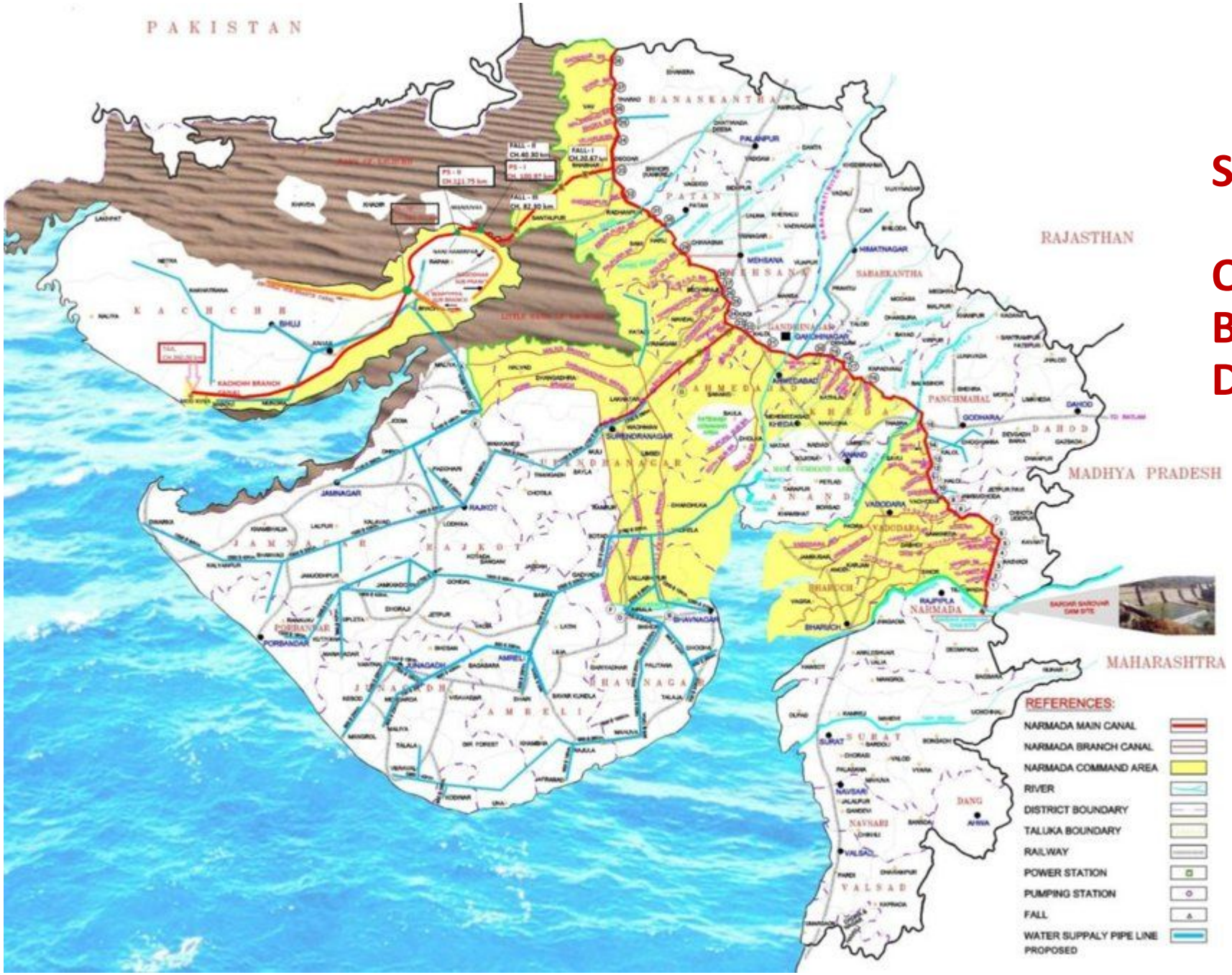
1	8	35	280
2	8	40	320
Total	16		600

Effect of Narmada Water in the Command Area as per Satellite Imageries





SSP – The Transformer



State-wide Water Grid

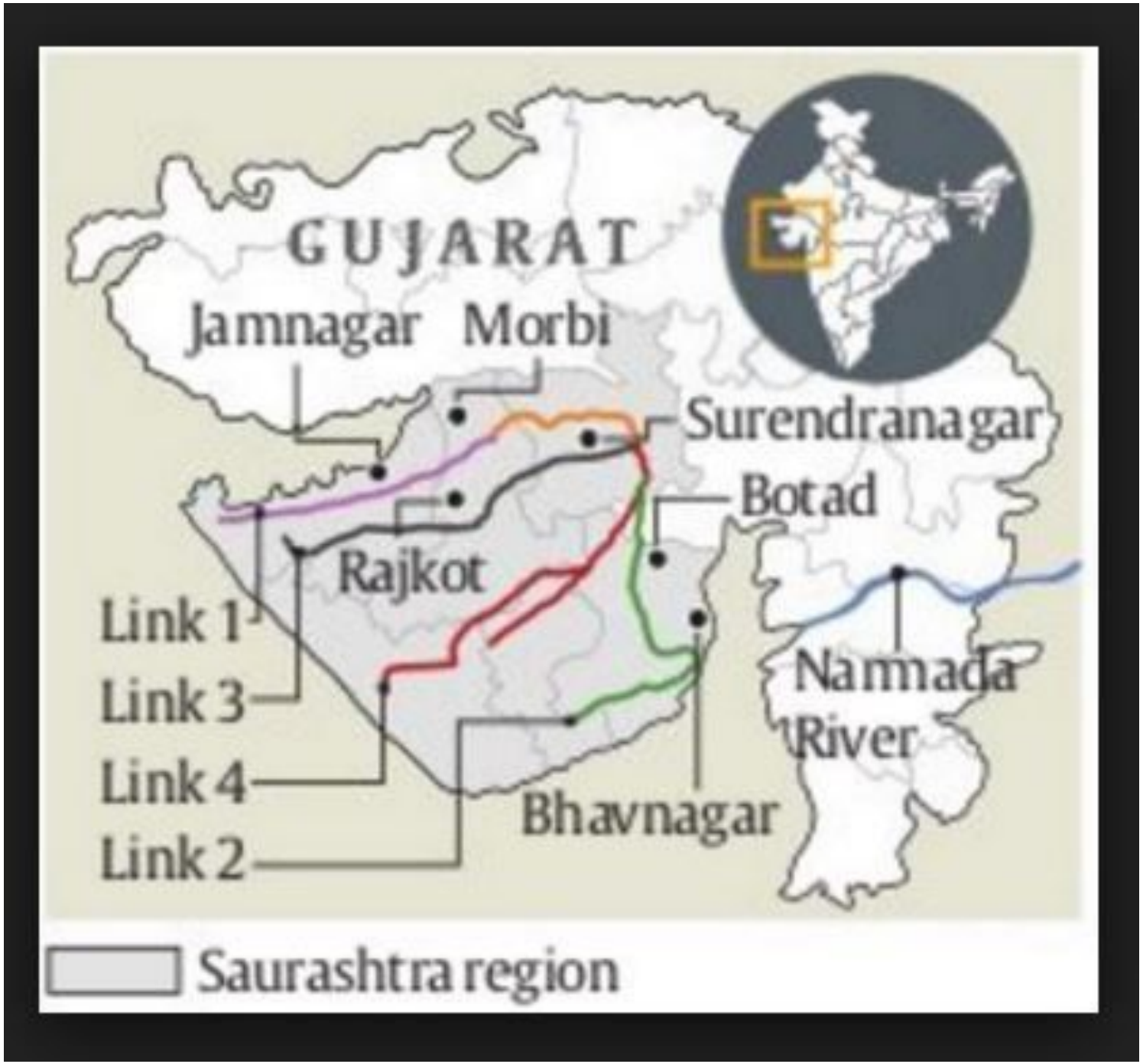
Open Canals
Bulk Pipelines
Distribution Network

Benefitting 40 million people

10,114 villages

183 Urban Centres

7 Municipal Corporations



SAUNI Yojana

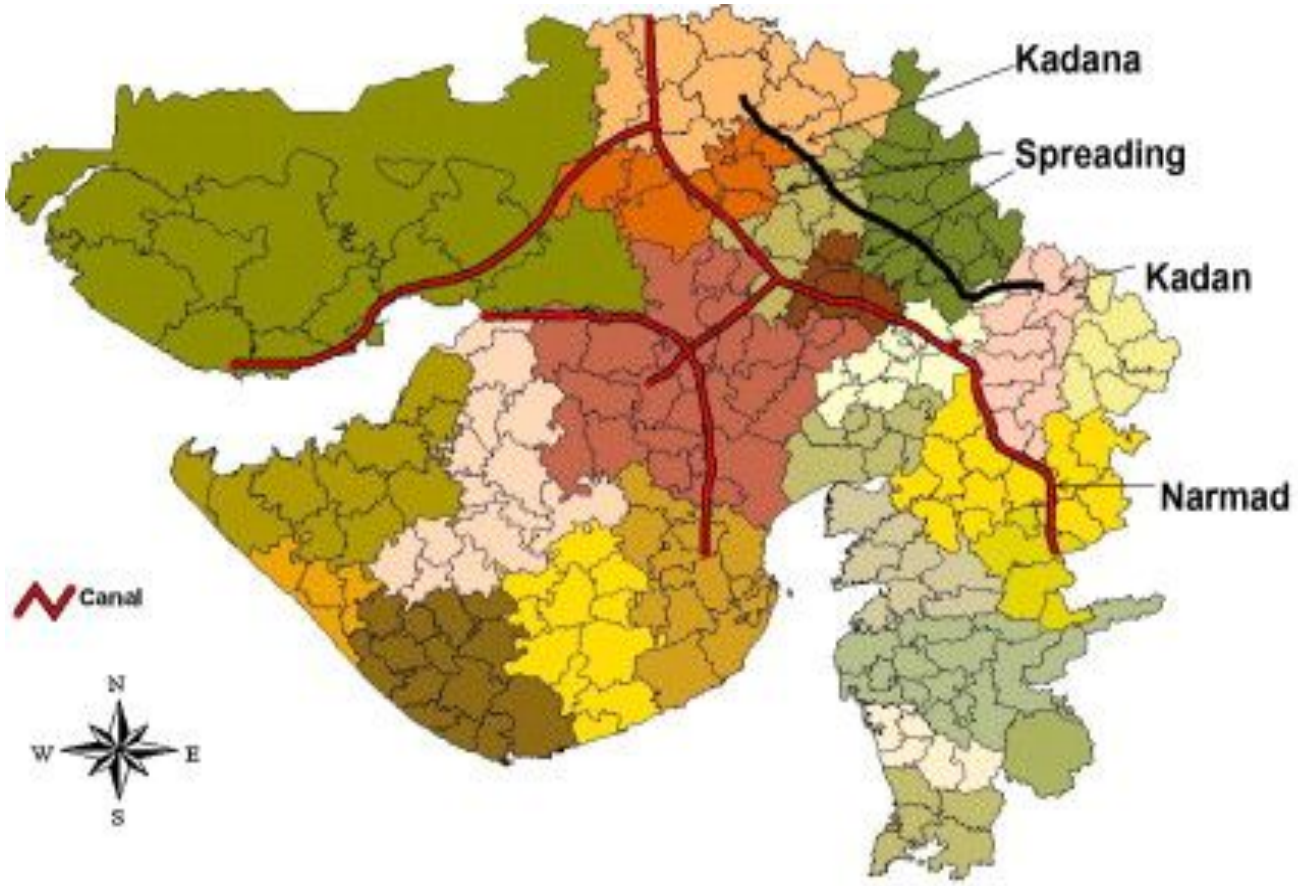
4 Links

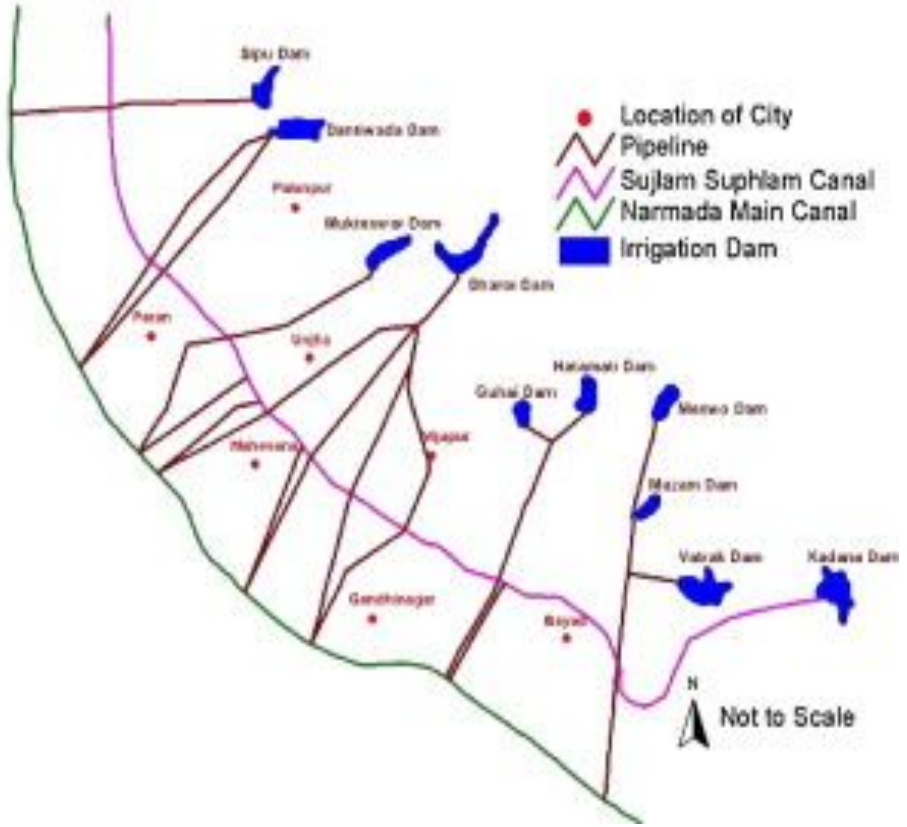
1371 km

connecting 115 existing Dams

The Sujalam Suphalam Spreading Canal project

involves diverting surplus flood water from the Kadana Reservoir and Narmada River through a 332 km canal to water stressed areas of North Gujarat...





More than 1.9 lakh Check Dams

Championing Water Conservation & Groundwater Recharge

Check Dams made of Sand Bags

Cost effective measures with People's Participation

Desalination Plants

Dahej, Bharuch district, 100 MLD - operational

Planned at eight places: Mundra, Mandvi, Dwarka, Porbandar, Sutrapada, Rajula, Ghogha, and Jodiya in Jamnagar district.

These upcoming plants will have a combined capacity of 37 crore liters (approximately 370 MLD).

Recycling Water

Large Scale Infrastructure for Water Conservation & Management

Citizen centric Roof-top Rain Water Harvesting

Water Conservation with Peoples' Participation

Sujalam Sufalam Jal Abhiyaan

Before

After

11,914 million cubic feet storage

1.07 lakh Projects completed

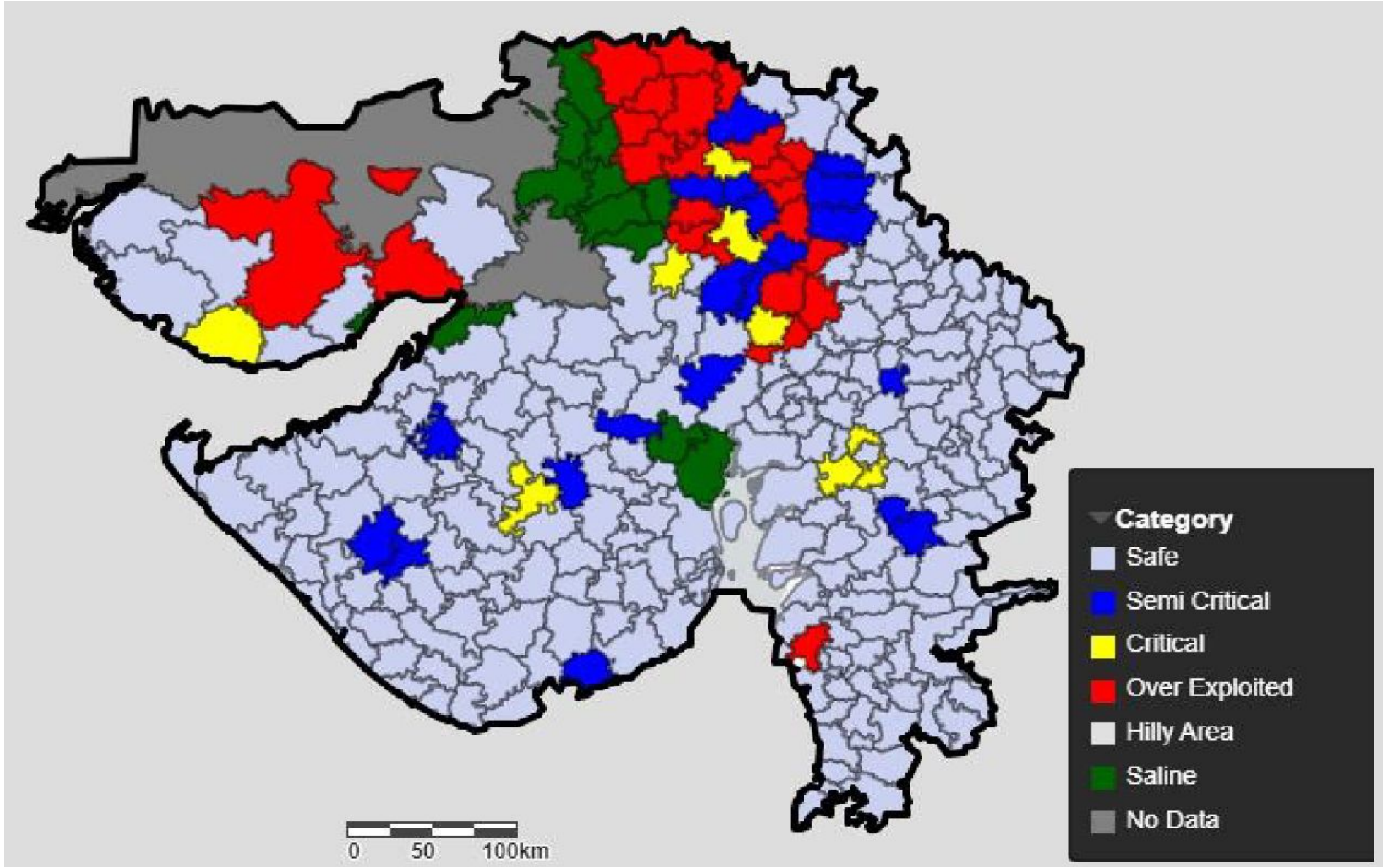
Converting Dry Sabarmati River Bed into scientifically developed River front Project

Rejuvenating Water Bodies : 2,650 AMRIT SAROVAR in 34 Districts

Mission Amrit Sarovar

Targeting 75 Amrit Sarovar in
Each District

Quantitative & Qualitative Improvement in Groundwater Conditions



Total Blocks
252

Overexploited
23

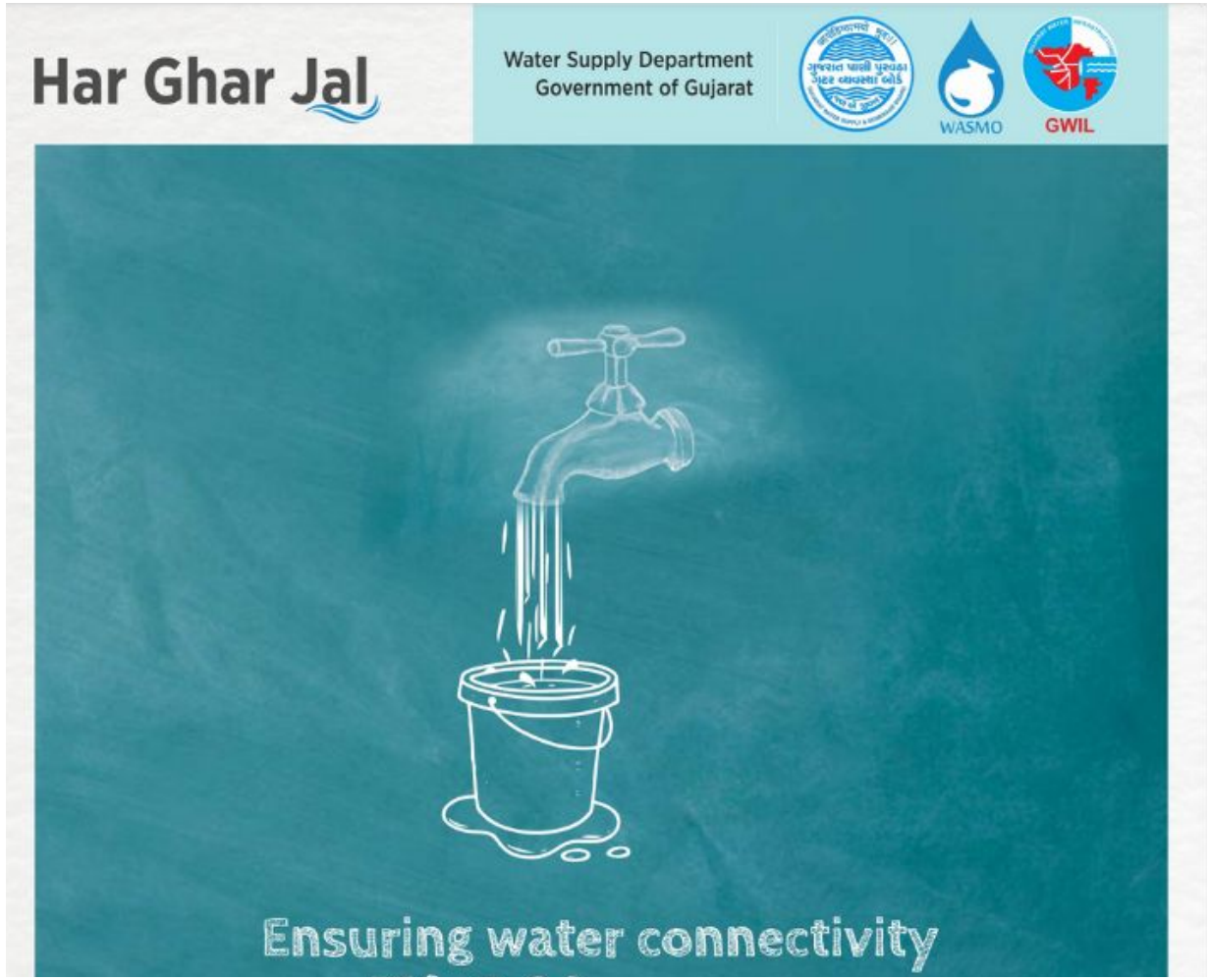
Critical
8

Semi-critical
20

Saline
12

Safe
189

Individual Tap Water Connections to 90% Rural Gujarat



The Case-study clearly shows . . .

- Water Scarcity : A major threat to Sustainable Development
- Necessity is the mother of Invention
- Strategically harnessing all options – The Key for Water Security & SDGs
- Macro & Micro options need to be viewed as complementary to each other
- Water Infrastructure for Regional Water Transfer ensures and improves Disaster Resilience of a region
- People’s participation – a MUST

THANKS FOR THINKING

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